



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/049,672

04/30/2002

Yasushi Kurata

566.411991X00

7706

20457

7590

01/03/2007

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER

DEO, DUY VU NGUYEN

ART UNIT

PAPER NUMBER

1765

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

01/03/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/049,672

Applicant(s)

KURATA ET AL.

Examiner

Duy-Vu N. Deo

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-33, 35, 41, 50, 51, 57, 62, 64-72 and 89-112 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-33, 35, 41, 50-51, 57, 62, 64-72, 89-112 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 26-33, 35, 41, 50-51, 56, 57, 62, 64, 69-72, 89-92, 97-100, 101, 104, 105, 106, 109-112 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee et al. (US 6,171,352).

Lee describes a polishing composition comprising: an oxidizing agent such as H₂O₂ (col. 3, line 5; col. 6, line 44); a protective-film-forming agent of benzotriazole and/or its derivatives (col. 4, line 19); an organic acid of glycolic acid (col. 3, line 23); deionized water (col. 4, line 11); 1-15 % wt of abrasive that can be any commercially available such as silica and alumina (claimed colloidal silica and alumina) (col. 2, line 66-col. 3, line 2; col. 3, line 67-col. 4, line 1); pH is from 1-6 (col. 4, line 31-40) (this includes claimed pH of 3 or less); and the oxidizing agent concentration is from 1-15 % by weight (col. 2, line 64), this includes concentration within claimed 0.01-3 %wt or 0.01-1.5 %wt. Lee's composition includes all the claimed components; therefore, it would have a property of being capable of polishing a barrier layer of Ta, Ta alloy, or Ta compound, which is a barrier layer for a conductor of Cu, Cu alloy or Cu oxide and has

Art Unit: 1765

a property that a ratio of a polishing rate of the barrier layer using the polishing medium, to a polishing rate of the conductor using the polishing medium, is greater than 1 or 1.3 (claim 111) or 13.5 (claim 112). Support for this presumption is found by the facts that the composition includes the same compounds with the same concentrations as that of the claims. The burden is upon the applicant to prove otherwise. In re Fitzgerald, 205 USPQ 594.

Referring to claims 27, 28, the composition further comprises polyacrylic acid copolymer or salts thereof (col. 2, line 47). This would read on claimed water-soluble polymer.

Referring to claim 35 Lee describes the method for polishing material including Cu and Ta (col. 4, line 38; col. 7, line 54).

Referring to claim 51, Lee's composition would have the polishing-rate ratio between different materials disclosed in claims 37, 38, 51, 52. Support for this presumption is found by the facts that the composition includes the same compounds with the same concentrations as that of the claims. The burden is upon the applicant to prove otherwise. In re Fitzgerald, 205 USPQ 594.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 1765

4. Claims 25, 65-68, 85-88, 93-96, 107, 108 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee as applied to claim 62 above, and further in view of Hardy et al. (US 6,238,592).

Lee is silent about the average size of the abrasive. Hardy describes a average particle size of 50 nm or less (col. 9, line 65-col. 10, line 5). It would have been obvious for one skill in the art to determine the particle size in light of Hardy because Hardy further describes other processing parameters, such as average size of the abrasive, that is silent in Lee and the range that has been successfully implemented in a polishing process. Even though applied prior art above does not describe standard deviation of the particle size distribution in a value of more than 5nm. It would have been obvious for one skill in the art to determine the standard deviation of the particle size distribution through test runs in order to provide a slurry for the polishing with a reasonable expectation of success.

Referring to claims 59, 65, 85, 93 Hardy further teaches that the polishing medium can contain abrasive or the abrasive can be fixed to abrasive article (col. 10, line 3-7). In the latter case, the polishing medium would not contain abrasive grains. This shows that either way would be equivalent and obvious at the time of the invention.

Referring to claims 54-57, even though applied prior art doesn't describe the pH of the oxidizing agent; however, it Would be obvious to one skilled in the art that oxidizing agent pH can be any value as long as it provides the final pH of the slurry within the range as suggested by the applied prior art.

Response to Arguments

5. Applicant's argument that Lee doesn't describe the slurry has a property that a ratio of a polishing rate of the barrier layer using the polishing medium, to a polishing rate of the conductor using the polishing medium, is greater than 1 or polishing rate ratio of Ta-containing material to silicon dioxide of more than 10 is acknowledged. However his slurry would inherently has these properties. Support for this presumption is found by the facts that the composition includes the same compounds with the same concentrations as that of the claims. The burden is upon the applicant to prove otherwise. In re Fitzgerald, 205 USPQ 594. Applicant has not shown facts that Lee's slurry would not has the rate ratios as that of the claimed invention.

Applicant's argument that Lee doesn't suggest to use low pH because he describes using a pH of 3.8 in the example is found unpersuasive because there is not specific teaching against using a lower pH. In fact he describes the pH from 1-6 (this would includes any pH under 3) has been successfully implemented in the polishing process (col. 4, line 31-40). Furthermore, there is no teaching in Lee against using a low concentration of oxidizing agent. His oxidizing concentration range is 1-15 % by weight (col. 2, line 64), this includes concentration within claimed 0.01-3 %wt or 0.01-1.5 %wt.

Declaration

6. The Declaration by Yasushi Kurata, filed 9/6/05 is found unpersuasive because it doesn't compare the claimed subject matter with the closest prior art. See MPEP 716.02(e) [R-2]. Applicant has not shown that the polishing medium with claimed

Art Unit: 1765

components and concentration provide an unexpected result over components and concentration of Lee's composition. It refer(s) only to the system described in the above referenced application and not to the individual claims of the application. Thus, there is no showing that the objective evidence of nonobviousness is commensurate in scope with the claims. See MPEP § 716. The examples show the composition having abrasive grains while some of the independent claims recites the composition having no abrasives grains.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duy-Vu N. Deo whose telephone number is 571-272-1462. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1765

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Duy-Vu N Deo
Primary Examiner
Art Unit 1765

12/26/06

